

WHAT IS CLAIMED IS:

1. An encoding apparatus that encodes, for compression, a multi-channel signal including digital signals from a plurality of channels by framing the signal, determining the number of steps of quantizing data in the frame and making entropy coding of the signals, the apparatus comprising:

a provisional-number-of-in-use-bits calculating means for calculating a sum of code length in a current frame as a provisional number of in-use bits for each channel by making entropy coding of the digital signals on the basis of the provisional number of quantizing steps provisionally determined for quantizing the digital signals;

an inter-channel bit allocation means for allocating the number of bits usable for each channel on the basis of a ratio of the provisional number of in-use bits for each channel with the total provisional number of in-use bits, which is the sum of the provisional numbers of the in-use bits for all the channels, and

a number-of-bits adjusting means for adjusting the number of in-use bits on the basis of the number of usable bits allocated to each channel.

2. The encoding apparatus as set forth in claim 1, wherein:

the multi-channel includes a plurality of group channels each including two or more channels;

the provisional-number-of-in-use-bits calculating means calculates the provisional number of in-use bits in the group channel; and

the inter-channel bit allocation means allocates the number of bits usable for

each group channel on the basis of a ratio of the provisional number of in-use bits for each group channel with the total provisional number of in-use bits, which is the sum of the provisional numbers of in-use bits for each group channel.

3. The encoding apparatus as set forth in claim 1, wherein the provisional-number-of-in-use-bits calculating means transforms a time-axial signal into a frequency-axial one and then quantizes the frequency-axial signal, and makes entropy coding of the quantized signal.

4. The encoding apparatus as set forth in claim 1, wherein the provisional-number-of-in-use-bits calculating means divides data in the current frame into units of coding and determines the provisional number of quantizing steps on the basis of a scale factor for normalization of the data included in the units of coding.

5. The encoding apparatus as set forth in claim 1, wherein the inter-channel bit allocation means allocates a part of the total number of allocable bits as the number of usable bits corresponding to the ratio of the provisional number of in-use bits for each channel with the total provisional number of in-use bits for all the channels.

6. The encoding apparatus as set forth in claim 5, wherein the inter-channel bit allocation means allocates other than the part of the total number of allocable bits evenly for each channel.

7. The encoding apparatus as set forth in claim 5, wherein the inter-channel bit allocation means makes a proportional allocation of other than the part of the total number of allocable bits for each channel correspondingly to a code length in which

each digital signal is encoded without being compressed.

8. The encoding apparatus as set forth in claim 1, wherein the digital signal is a digital audio signal.

9. An encoding method of encoding, for compression, a multi-channel signal including digital signals from a plurality of channels by framing the signal, determining the number of steps of quantizing data in the frame and making entropy coding of the signals, the method comprising the steps of:

calculating a sum of code length in a current frame as a provisional number of in-use bits for each channel by making entropy coding of the digital signals on the basis of the provisional number of quantizing steps provisionally determined for quantizing the digital signals;

allocating the number of bits usable for each channel on the basis of a ratio of the provisional number of in-use bits for each channel with the total provisional number of in-use bits, which is the sum of the provisional numbers of in-use bits for all the channels, and

adjusting the number of in-use bits on the basis of the number of usable bits allocated to each channel.

10. The encoding method as set forth in claim 9, wherein:

the multi-channel includes a plurality of group channels each including two or more channels;

the provisional number of in-use bits in the group channel is calculated in the

provisional-number-of-in-use-bits calculating step; and

the number of bits usable for each group channel on the basis of a ratio of the provisional number of in-use bits for each group channel with the total provisional number of in-use bits, which is the sum of the provisional numbers of in-use bits for each group channel, is allocated in the inter-channel bit allocation step.

11. The encoding method as set forth in claim 9, wherein in the provisional-number-of-in-use-bits calculating step, there is transformed a time-axial signal into a frequency-axial one and then quantizes the frequency-axial signal, and makes entropy coding of the quantized signal.

12. The encoding method as set forth in claim 9, wherein in the provisional-number-of-in-use-bits calculating step, there is divided data in the current frame into units of coding and determines the provisional number of quantizing steps on the basis of a scale factor for normalization of the data included in the units of coding.

13. The encoding method as set forth in claim 9, wherein in the inter-channel bit allocation step, there is allocated a part of the total number of allocable bits as the number of usable bits corresponding to the ratio of the provisional number of in-use bits for each channel with the total provisional number of in-use bits for all the channels.

14. The encoding method as set forth in claim 13, wherein in the inter-channel bit allocation step, there is allocated other than the part of the total number of allocable

bits evenly for each channel.

15. The encoding method as set forth in claim 13, wherein in the inter-channel bit allocation step, there is made a proportional allocation of other than the part of the total number of allocable bits for each channel correspondingly to a code length in which each digital signal is encoded without being compressed.

16. The encoding method as set forth in claim 9, wherein the digital signal is a digital audio signal.

17. A program for allowing a computer to encode, for compression, a multi-channel signal including digital signals from a plurality of channels by framing the signal, determining the number of steps of quantizing data in the frame and making entropy coding of the signals, the program comprising the steps of:

calculating a sum of code length in a current frame as a provisional number of in-use bits for each channel by making entropy coding of the digital signals on the basis of the provisional number of quantizing steps provisionally determined for quantizing the digital signals;

allocating the number of bits usable for each channel on the basis of a ratio of the provisional number of in-use bits for each channel with the total provisional number of in-use bits, which is the sum of the provisional numbers of in-use bits for all the channels, and

adjusting the number of in-use bits on the basis of the number of usable bits allocated to each channel.